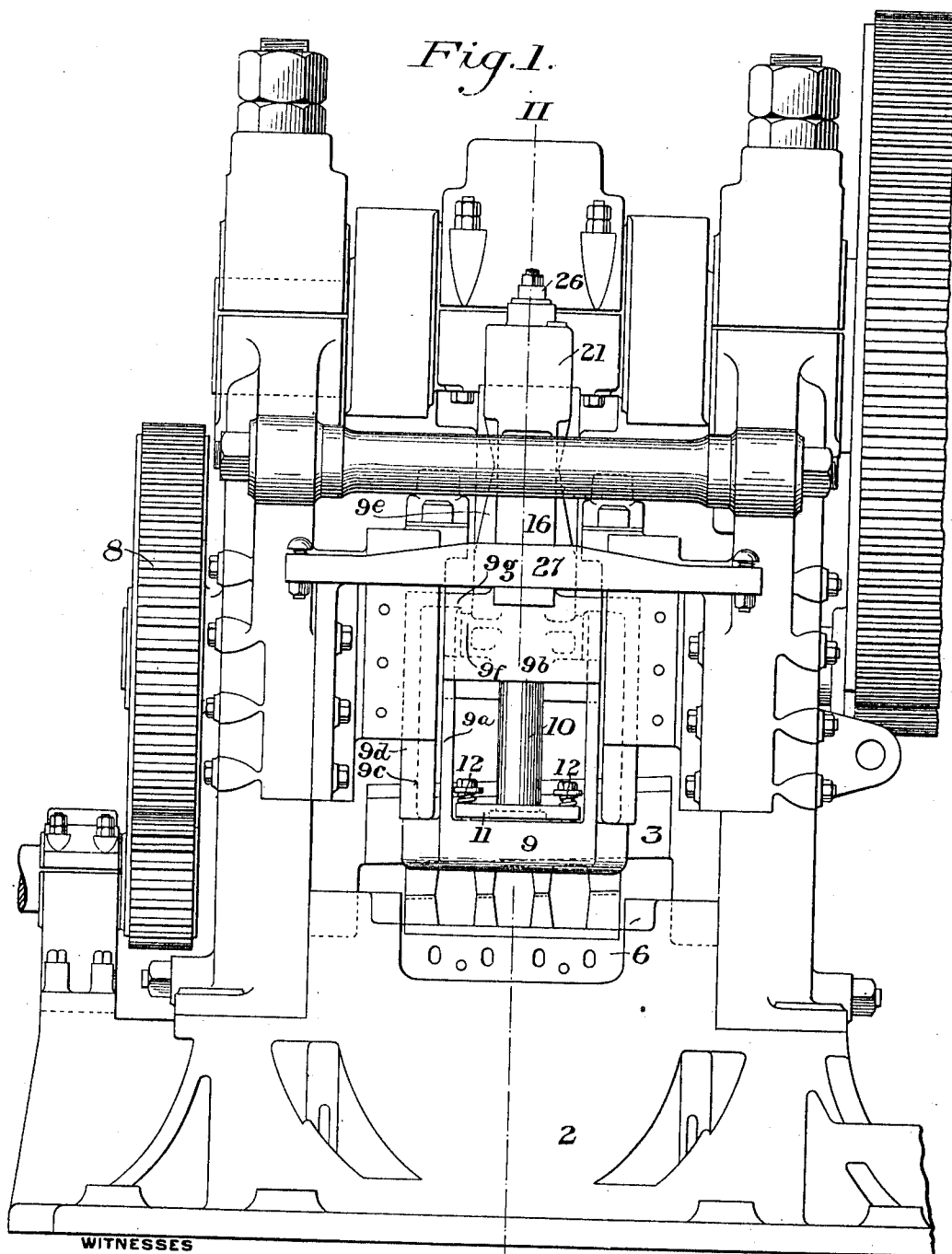


K. C. GARDNER & F. C. BIGGERT, JR.
HOLDING DOWN DEVICE FOR SHEARS, PUNCHES, PRESSES, &c.
APPLICATION FILED DEC. 18, 1909.

980,241.

Patented Jan. 3, 1911.

3 SHEETS-SHEET 1.



WITNESSES
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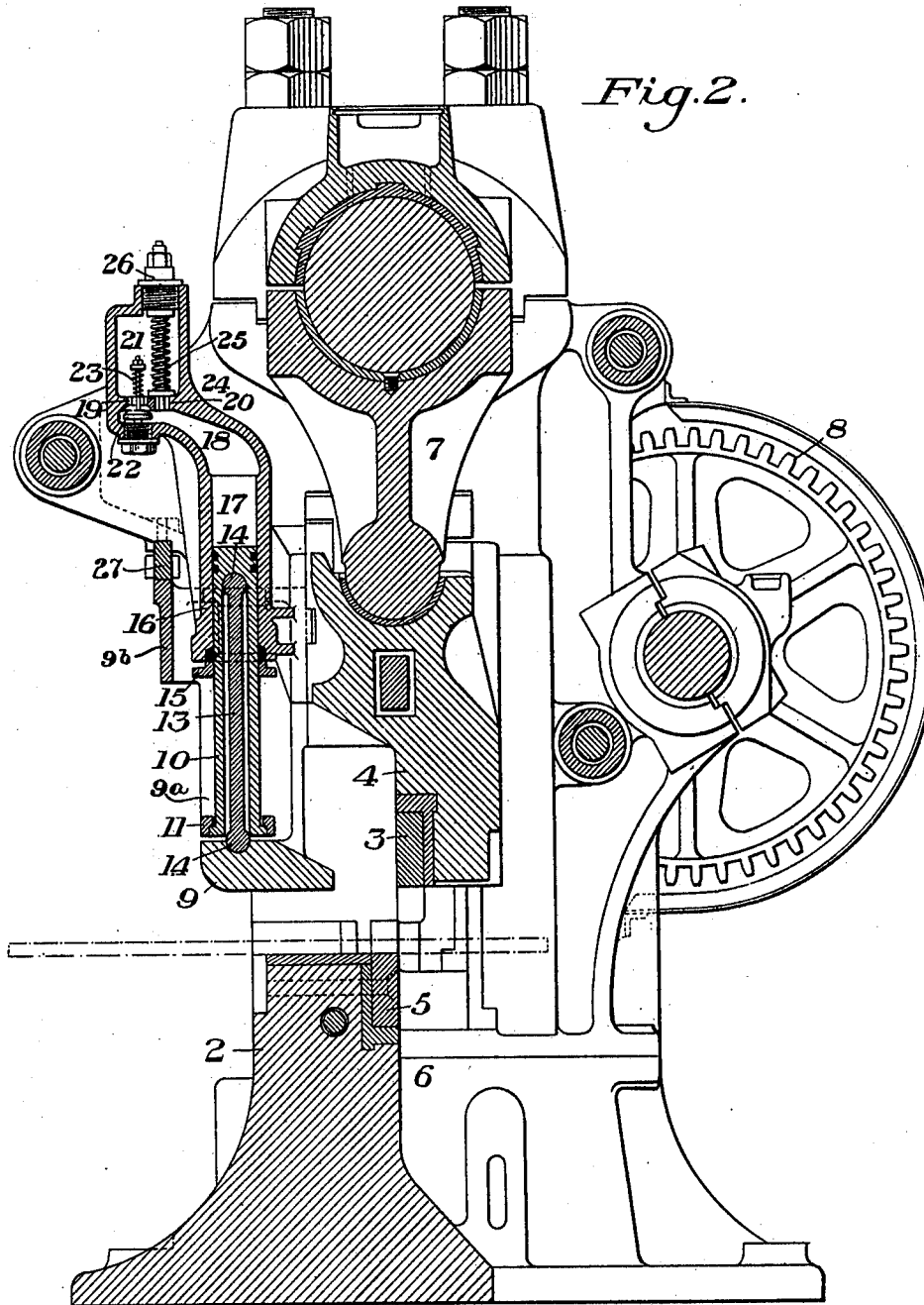


Fig. 2.

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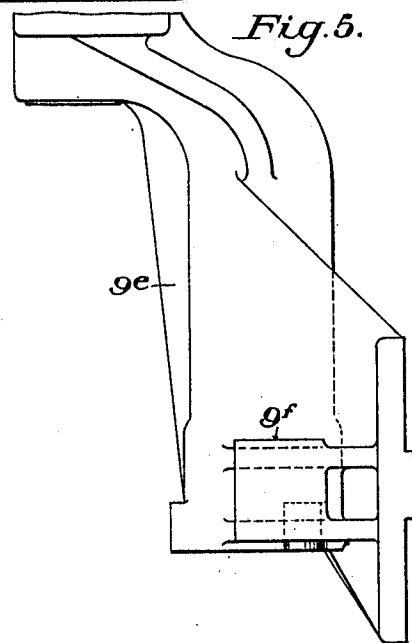
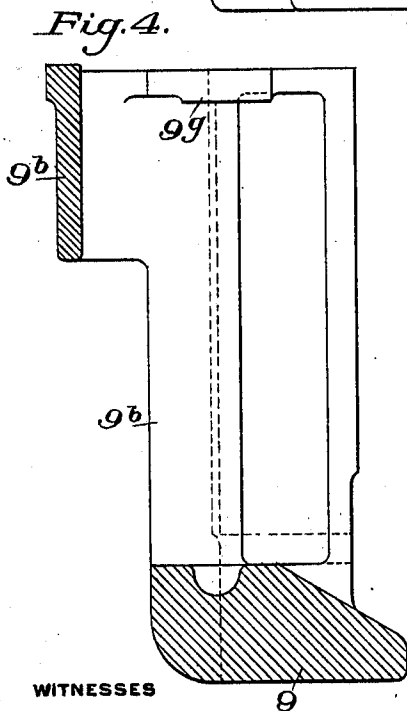
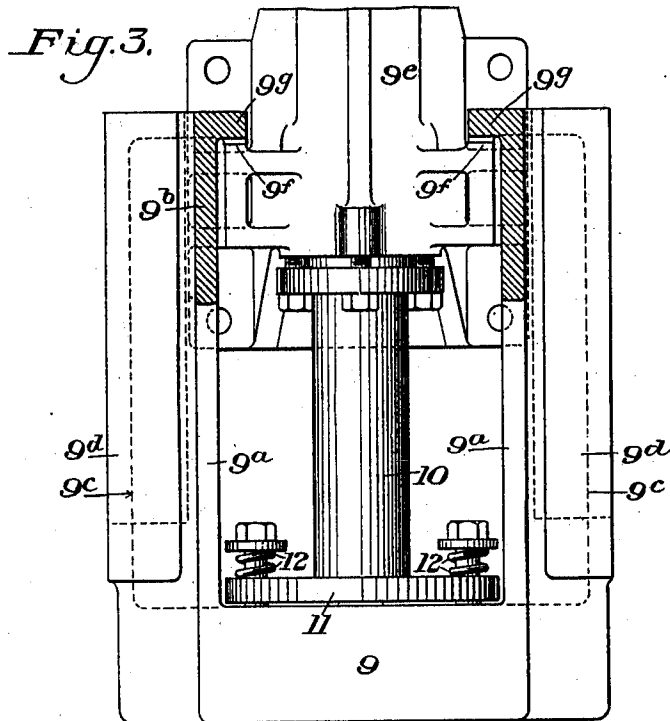
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3 SHEETS—SHEET 3.

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WITNESSES

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UNITED STATES PATENT OFFICE.

KIRTLAND C. GARDNER AND FLORENCE C. BIGGERT, JR., OF PITTSBURG, PENNSYLVANIA, ASSIGNORS TO UNITED ENGINEERING & FOUNDRY COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

HOLDING-DOWN DEVICE FOR SHEARS, PUNCHES, PRESSES, &c.

980,241.

Specification of Letters Patent.

Patented Jan. 3, 1911.

Application filed December 18, 1909. Serial No. 533,918.

To all whom it may concern:

Be it known that we, KIRTLAND C. GARDNER and FLORENCE C. BIGGERT, Jr., both of Pittsburgh, Allegheny county, Pennsylvania, have invented a new and useful Holding-Down Device for Shears, Punches, Presses, &c., of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front elevation, partly broken away, of a portion of a shearing machine having our invention applied thereto; Fig. 2 is a section on the line II—II of Fig. 1; Fig. 3 is a front elevation partly in vertical section of a portion of the machine; Fig. 4 is a detail view showing the shoe member in vertical section; and Fig. 5 is a side view showing the bracket by which the parts embodying our improvement are attached to the machine.

Our invention has relation to the class of metal shears, presses, punches, etc., and is designed to provide a work holding-down attachment therefor of simple, novel and efficient character.

The precise nature of our invention will be best understood by reference to the accompanying drawings in which we have shown the preferred embodiment thereof, and which will now be described, it being premised, however, that various changes may be made in the details of construction and arrangement of the parts without departing from the spirit and scope of our invention as set forth in the appended claims.

In the drawings, in which we have shown the invention applied to a shear, the numeral 2 designates the frame of the shear, 3 the upper movable shear blade mounted in the reciprocating head or carrier 4, and 5 is the lower stationary shear blade secured to the shear block or anvil 6. 7 designates the actuating crank for the head or carrier 4, and which is driven through the gearing 8. The shears shown are in general of well-known type, and need not be specifically described, our invention being independent of the shears proper and relating solely to the holding-down attachment therefor, and which is capable of application to various types of shears, and also to punches, presses, etc.

The invention comprises a transversely

arranged holding-down shoe or foot 9 placed transversely above the shear block or anvil 6 and adapted to engage the upper side of the work piece. This shoe or foot is somewhat loosely connected to a piston 10 by means of the cross-bars 11 and springs 12 and by the link 13. This link has the ball portion 14 at each end, one of these portions having a seat in the upper face of the block, while the other end bears in the concave seat in the upper portion of the piston, which is made hollow to receive the link. The piston extends upwardly through a stuffing box 15 into a cylinder 16. The space 17 within the cylinder above the upper end of the piston is designed to be filled with oil or other suitable fluid. This space is connected by the passage 18, and the two ports 19 and 20 with a chamber 21. The port 19 is controlled by an upwardly seating valve 22, which is normally held away from its seat by the action of a spring 23; and the port 20 is normally closed by a downwardly seating valve 24 held to its seat by a spring 25, the two springs 23 and 25 being arranged in the chamber 21. The chamber 21 is provided with a suitable filling aperture closed by a removable screw plug 26, or by other suitable means, this aperture also permitting access to the valves. The shoe 9 is provided with the upwardly extending side portions 9^a, which are connected at their upper ends by the transverse portion 9^b. The side portions 9^a are provided with the lateral guiding tongues or flanges 9^c, which work in guides 9^d secured to the reciprocating head of the shear. 9^e is a bracket which is also rigidly secured to the reciprocating head and which is provided with the lugs 9^f, which are engaged by overhanging lugs 9^g at the upper portion of the side members 9^a of the shoe 9, the engagement of the lugs 9^g with the lugs 9^f serving to normally hold the shoe raised when the shear is opened.

The operation is as follows: The parts being in the position shown in Figs. 1, 2 and 3, the downward stroke of the shear head or carrier 4 brings the shoe 9 into engagement with the work and further downward movement of the head or carrier causes the piston or plunger to be forced upwardly into the cylinder against the pressure of the fluid therein. This pressure opens the valve 24 and a portion of the fluid

escapes through the port 20 into the chamber 21. On the reverse stroke of the head 4, the parts are carried upwardly therewith until the shoe or carrier comes in contact with the fixed transverse stop or knock-down bar 27, which prevents its further upward movement, the cylinder sliding upwardly on the piston during the remaining portion of the up-stroke of the head. This releases the pressure which has been holding the valve 22 seated and the spring 25 opens said valve and permits fluid from the chamber 21 to flow back into the passage 18 and cylinder space 17. The stop or knock-down bar 27, however, only comes into action as a means of returning the cylinder to its original position after the shear has made a cut, in case the plunger works so stiff in the cylinder as to cause it to rise with the cylinder. If the piston or plunger works freely in the cylinder, it will remain in its lowered position until the lugs 9^c contact with the lugs 9^a, as before described.

The loose connection between the foot or shoe 9 and the piston enables the shoe to adjust itself on the lower ball end of the link 13 so as to seat squarely upon the work piece notwithstanding irregularities thereof. The device described forms a very simple, convenient and efficient attachment for the purpose, which can be readily applied to existing shears.

It will be obvious that various changes may be made in the details of construction and arrangement with the several parts. Thus, the shoe or foot may be differently attached; changes may be made in the arrangement of the piston and cylinder; and changes may also be made in the arrangement of the chamber or reservoir 21 and of the ports and valves which control the connections between the same and the interior of the cylinder.

The application of the invention to other types of metal working machines, such as punches and presses, will be apparent to those skilled in the art.

What we claim is:—

1. The combination with a metal working machine having a reciprocating head or carrier, of a work-holding device mounted on the head or carrier and comprising a hold-

ing-down member, a plunger connected thereto, a cylinder within which the plunger works, a liquid chamber having two ports leading into the cylinder, and oppositely acting check valves controlling said ports, substantially as described.

2. The combination with a metal working machine having a reciprocating head or carrier, of a work-holding device mounted on the head or carrier and comprising a holding-down member, a plunger connected thereto, a cylinder within which the plunger works, a liquid chamber having two ports leading into the cylinder, and oppositely acting check valves controlling said ports, said holding-down member having upward extensions and a stop or knock-down bar for contact therewith, substantially as described.

3. The combination with a metal working machine having a reciprocating head or carrier, of a work-holding device mounted on the head or carrier and comprising a holding-down member, a plunger connected thereto, a cylinder within which the plunger works, a liquid chamber having two ports leading into the cylinder, and oppositely acting check valves controlling said ports, the cylinder space above the plunger, the chamber, and the connecting ports forming a closed system adapted to be filled with liquid, substantially as described.

4. The combination with a metal working machine having a reciprocating head or carrier, of a work-holding device mounted on the head or carrier and comprising a holding-down member, a plunger connected thereto, a cylinder within which the plunger works, a liquid chamber having two ports leading into the cylinder, and oppositely acting check valves controlling said ports, together with means for permitting and guiding the independent vertical movement of the holding-down member, substantially as described.

In testimony whereof, we have hereunto set our hands.

KIRTLAND C. GARDNER.
FLORENCE C. BIGGERT, Jr.

Witnesses:

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